Overview of the ISECG Mission Scenario

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Chair, International Architecture Working Group

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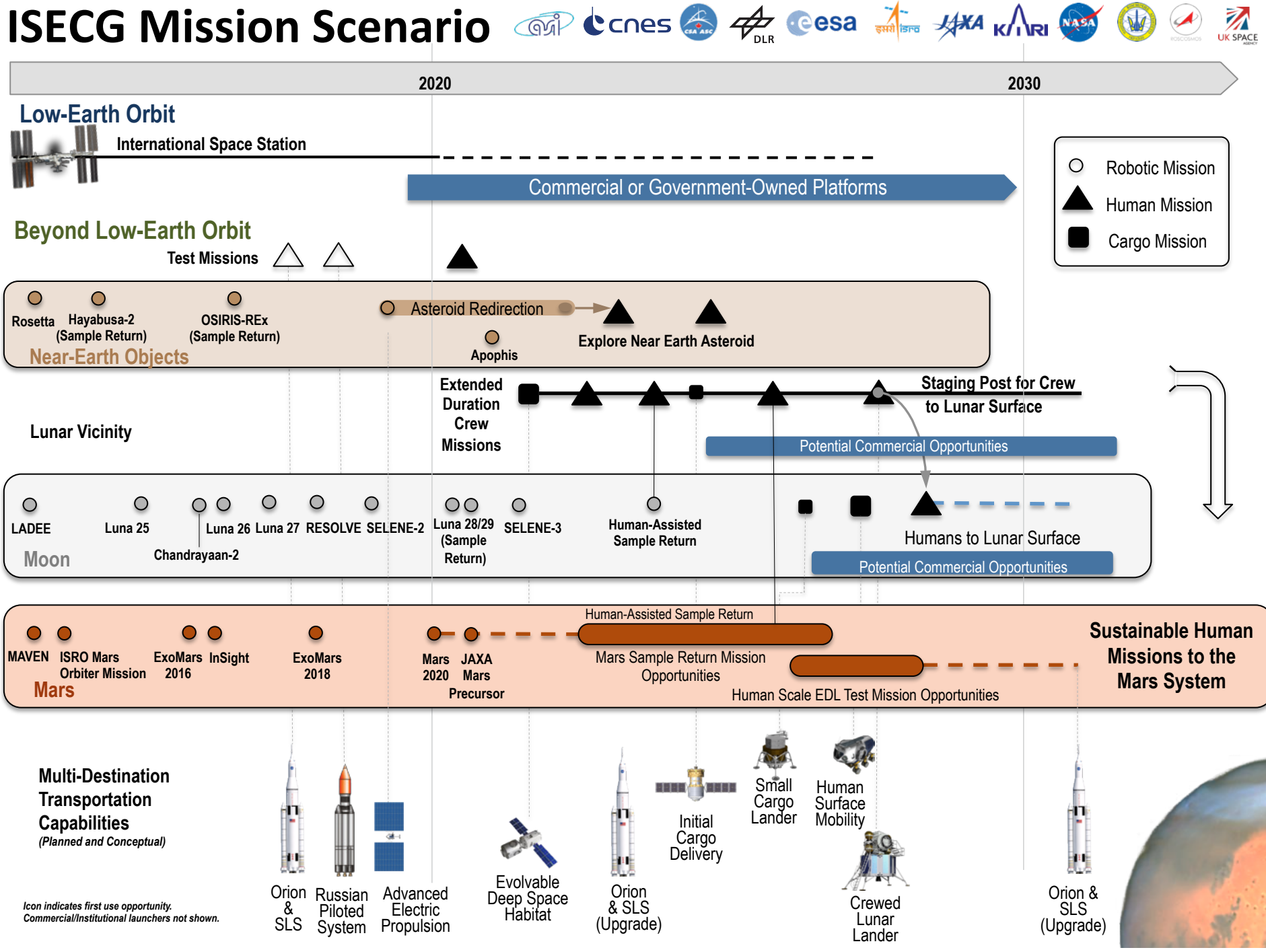
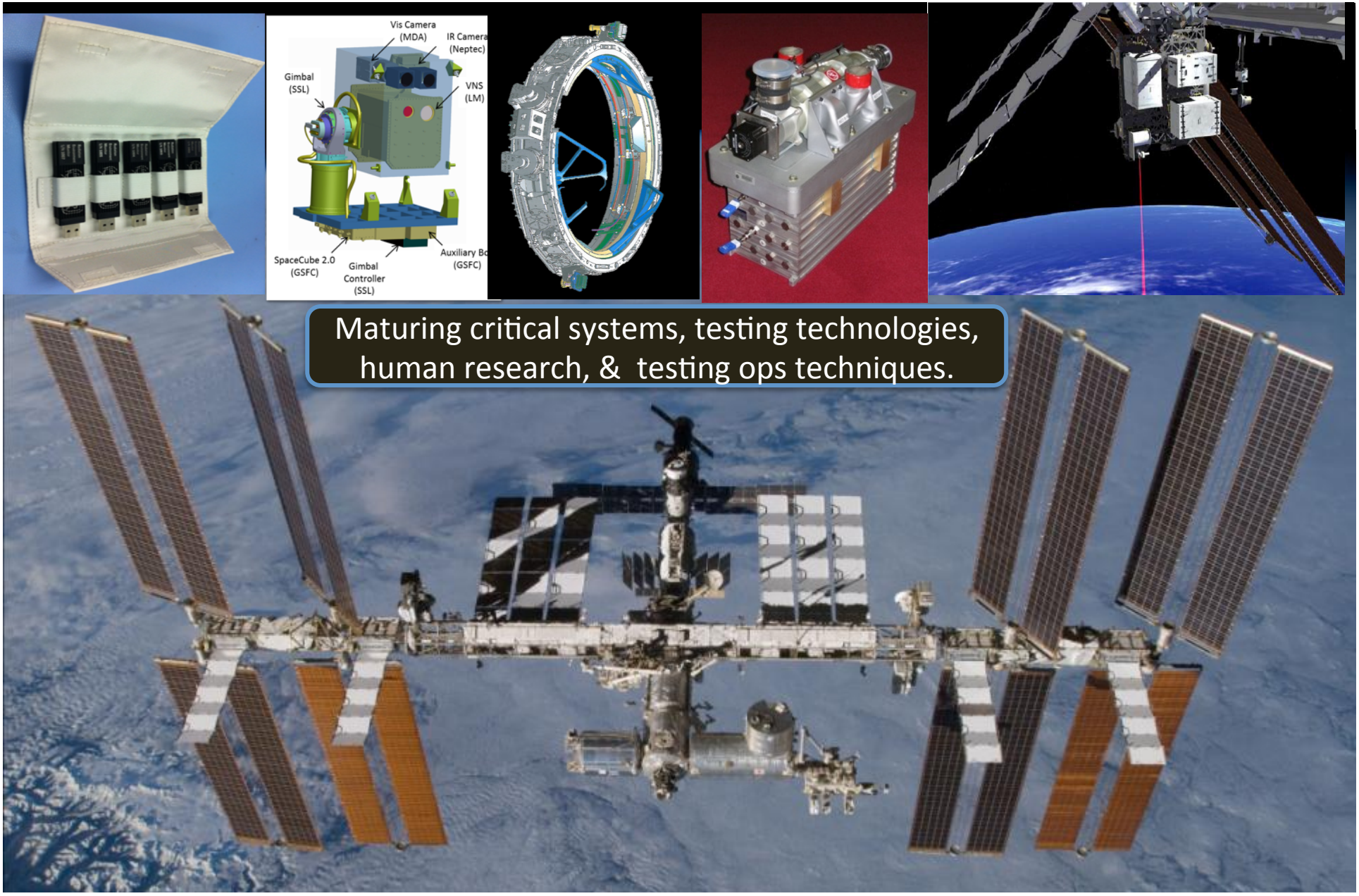
ISECG Mission Scenario



ISS for Exploration



Maturing critical systems, testing technologies, human research, & testing ops techniques.

Exploration of a Near Earth Asteroid

Human exploration of an asteroid which has been captured and redirected to lunar vicinity

Enabling Capabilities

NASA's SLS and Orion

Advanced Electric Propulsion

Extra Vehicular Activity

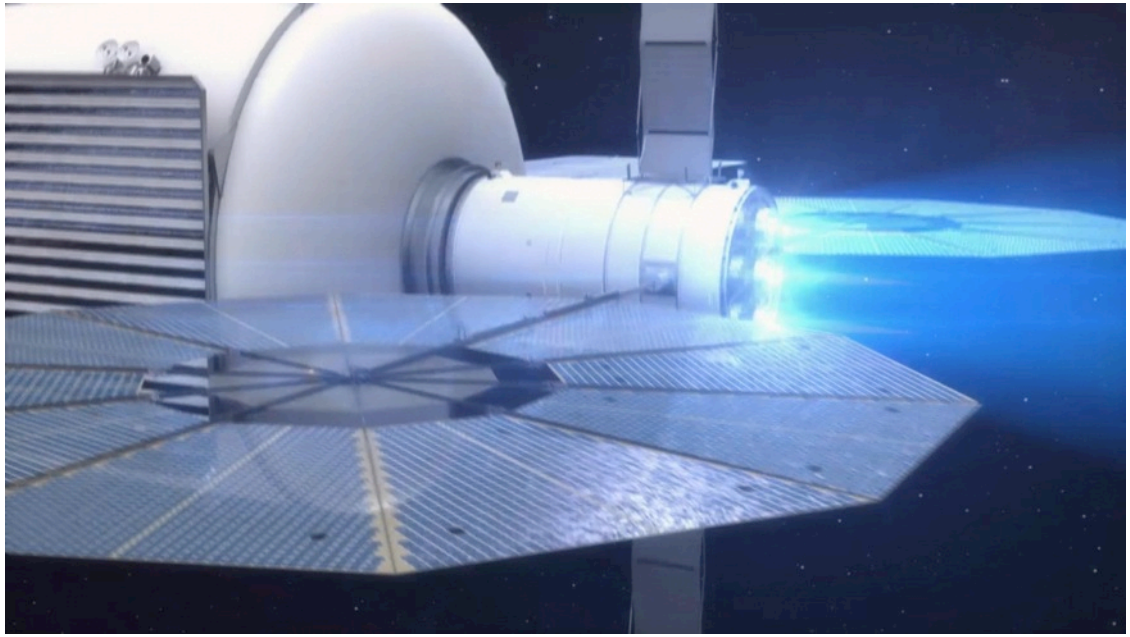
Contributions to Mars Mission Readiness

Demonstration of the following core capabilities:

- Space Launch System and Orion
- 30-50kW Solar Electric Propulsion System
- Spacewalk, rendezvous, proximity operations, docking or grapple, deep space navigation and communications.

Mission Activities

- Characterize the composition of the asteroid
- Identify any resources and assess their potential for extraction
- Apply human evaluation capabilities to select samples for return to Earth laboratories
- Demonstrating sample acquisition, caching, storage operations, and crew transfer operations for future human-assisted sample return mission.



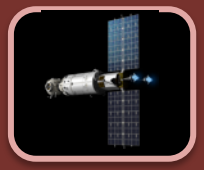
Extended Duration Crew Missions

Visits to an evolvable Deep Space Habitat in the lunar vicinity

Enabling Capabilities

NASA's SLS and Orion

Russian Piloted System



Evolvable Deep Space Habitat

Cargo Delivery

Mission Activities

- Advancing deep space human space flight operations and techniques, including staging operations
- Conducting high priority science benefitting from human presence, including human-assisted lunar sample return.
- Testing technologies and subsystems benefitting from the deep space environment
- Characterizing human health and performance in a deep space environment

Contributions to Mars Mission Readiness

- Demonstrate deep space exploration capabilities such as SLS, Orion, advanced Russian crew transportation capabilities and life support systems, achieving an acceptable level of risk prior to travel to destinations away from the relative safety of Earth's orbit
- Demonstrate autonomous crew operation capability
- Demonstrate operations with reduced supply chain
- Increase experience with complex deep space staging operations
- Advance core technologies and radiation protection strategies for long duration missions
- Demonstrate interactive human and robotic operations analogous to Mars operational concepts
- Gain experience with solar electric propulsion used on a crewed spacecraft

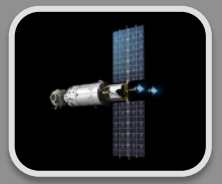
Humans to the Lunar Surface

Using evolvable Deep Space Habitat as staging post

Enabling Capabilities

NASA's SLS and Orion

Russian Piloted System



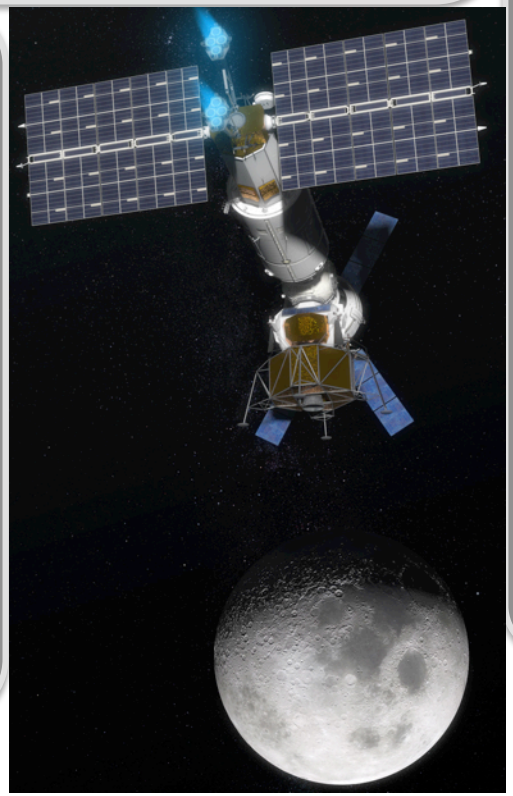
Evolvable Deep Space Habitat

Lunar Lander

Cargo Delivery

Mission Activities

- Test advanced surface power technologies
- Address high priority objectives of the science community which benefit from human surface presence
- Characterize human health and performance in a partial gravity environment
- Demonstrate long distance mobility concepts
- Explore concepts for human-robotic partnership in planetary surface exploration
- Utilize precision landing technologies demonstrated on robotic missions
- Explore landing sites of interest for extended durations



Contributions to Mars Mission Readiness

- Demonstrate staging operations with an Earth-return vehicle
- Demonstrate extended crew mobility and habitation systems
- Demonstrate advanced power systems
- Characterize human health and performance, combining deep space and partial gravity environment exposure
- Demonstrate operations concepts and enhanced crew autonomy for surface exploration
- Potentially provide the opportunity for advancing concepts related to the use of local resources